Department of Resources Recycling and Recovery

SCOPE OF WORK
Tire-Derived Aggregate Technology Center and Civil Engineering Material Testing Services

I. INTRODUCTION/OBJECTIVES

CalRecycle has sponsored numerous research and direct field applications of Tire-Derived Aggregate (TDA) in civil engineering projects in California over the past 20 years. The experience and knowledge obtained during these studies have been invaluable for successful use of TDA in civil engineering applications and have led to a TDA grant program which is currently awarded annually.

The purpose of this Scope of Work (SOW) is to continue to operate the TDA Technology Center, which was established in 2012, to assist CalRecycle in increasing the use of TDA in civil engineering applications. Through the TDA Technology Center, the California State University, Chico Research Foundation (Contractor) will provide support to both private and public engineers to gain acceptance of TDA as a viable civil engineering construction material and thereby create more opportunities for TDA projects.

The material testing services aspect of the contract will support CalRecycle and local agencies by investigating and testing the engineering properties of TDA and rubberized asphalt concrete (RAC) that are necessary to ensure the performance of these materials in civil engineering applications.

This SOW addresses the activities for the TDA Technology Center and Material Testing Services for the period from May 16, 2014 through May 15, 2016.

II. WORK TO BE PERFORMED

The Contractor shall:

1. **Operate and Improve the TDA Technology Center.** The objectives of this Center include:

   a. Assist in TDA technology transfer and training activities for State and local government officials and staff;
   b. Complete field and laboratory studies and investigations to assist CalRecycle in promoting TDA applications in civil engineering;
   c. Maintain a TDA Technology Center website to support TDA applications; and
   d. Develop supplemental educational materials for the existing TDA curriculum.

2. **Perform Testing Services for Using Waste Tires as Civil Engineering Materials:**

   a. Perform testing on TDA samples. The types of tests will include TDA gradation tests, TDA compaction and modulus tests, permeability tests, and shear strength tests.
   b. Perform testing on RAC samples. These tests will include asphalt rubber binder testing (PG grade testing), rubberized asphalt concrete testing (Hamburg, APA, and Rolling Compaction), and Superpave testing related to the rubberized asphalt concrete (Gyratory Compaction, volumetric, 4-point beam fatigue, etc.).

3. **Prepare and submit quarterly reports and a final report to CalRecycle**

III. TASKS IDENTIFIED

Task 1: Operate the TDA Technology Center at the California State University, Chico Research Foundation (CSUCRF)

a. Assist in TDA technology transfer and training activities for State and local government officials and staff

The TDA Technology Center staff shall respond to general questions about TDA and provide technical assistance to CalRecycle and other State or local government agencies. It shall also provide training to TDA testing laboratory staff on TDA specifications, testing equipment, and protocols to ensure quality control and quality assurance of TDA samples.

The TDA Technology Center staff shall also assist CalRecycle staff with general outreach efforts to other state agencies such as the Department of Transportation (Caltrans) and local agencies to promote the use of TDA. For example, agencies who may be considering a landslide repair project using TDA may contact the TDA Technology Center to request information (i.e., brochures, technical papers, existing project design information) to educate them on the benefits of using TDA design as compared to conventional landslide repair design. TDA Technology Center staff may also coordinate meetings between agencies, CalRecycle staff, and TDA technical contractors to provide direct consultation or to make presentations on a specific TDA application.

b. Laboratory and Field Studies and Investigations

TDA Technology Staff shall conduct studies and investigations involving the use of TDA, upon the written request of CalRecycle's Contract Manager. As barriers to the use of TDA are identified by state and local governments, CalRecycle may request the TDA Technology Center to investigate the problems and suggest possible solutions. This could include:

- Continue to monitor the field performance of past testing walls and other TDA test sites in California
- Provide investigations of various field projects. In the event that a TDA project does not perform as expected, the Contractor shall contact the agency who constructed the project to coordinate an investigation with CalRecycle staff and TDA technical contractors to determine the cause and provide recommendations for mitigation and changes to the way future TDA projects are designed and constructed.
- Conduct laboratory research to determine engineering properties of TDA. In the event that this research requires the purchase of equipment by the TDA Technology Center, all such purchases require specific written approval by the CalRecycle Contract Manager in advance. All purchases shall adhere to all CSU bidding standards.
- Write papers, technical reports, and other publications to enhance the knowledge of TDA as a construction material and make presentations at engineering conferences and workshops to promote the use of TDA.

c. Provide a Knowledge-based Website to Support TDA Applications

TDA Technology Center staff shall operate and maintain a TDA Technology Center website that will host current knowledge, training materials, and the latest news on TDA. It shall be linked to the CalRecycle website and the CSUCRF's website.

d. Dissemination of educational and informational materials

Under the direction of the CalRecycle Contractor Manager, the TDA Technology Center shall conduct training and workshops to educate professors and university students on the applications of TDA in civil engineering applications, and related testing to ensure the successful applications of these products. The materials may also be disseminated at conferences where CSUCRF staff will present findings from the work performed under this contract.

Task 2: Testing Services for Using Waste Tire as Civil Engineering Materials

To increase the usage of waste tires in civil engineering applications, the Contractor shall provide the following services to state and local agencies and grantees of the CalRecycle TDA Grant Program. In the event that additional equipment must be purchased to enhance the material testing capability of the TDA Technology Center, all such purchases require specific written approval by the CalRecycle Contract Manager in advance. All purchases shall adhere to all CSU bidding standards.

a. TDA Laboratory and Field Testing Services

In order to improve the quality of TDA projects, the TDA Technology Center shall provide, as directed by the CalRecycle Contract Manager, TDA specification related testing services. The types of tests may include, but are

not limited to, TDA specification validation testing, which may include: actual sample collection at the TDA processing facility or the TDA project site, gradation testing to assure compliance with project specifications, and Quality Control and Quality assurance for new TDA testing laboratories. The testing will be managed and conducted by TDA Technology Center staff. These services will support and help ensure successful TDA projects built by state or local agencies and TDA grantees.

b. RAC Laboratory and Field Testing Services

Caltrans plans to change its mix design and specifications from the traditional Hveem design method to the Superpave mix design and material specifications. Since this is a new requirement, there are a limited number of laboratories that can perform the Superpave testing. In addition, many local agencies do not have the equipment and resources available to perform testing, let alone the Superpave testing, for their projects. Therefore, CalRecycle needs to provide local agencies with additional testing support in order to comply with the new Caltrans Superpave mix design and materials specifications using rubber.

Under this contract, the TDA Technology Center will provide local agencies with the testing needed to comply with the new Superpave mix design and specifications. These tests may include but are not limited to: asphalt rubber binder testing (PG grade testing), rubberized asphalt concrete testing (Hamburg, APA, and Rolling Compaction), and Superpave testing related to the rubberized asphalt concrete (Gyratory Compaction, volumetric, 4-point beam fatigue, etc.). The Contractor shall purchase a laboratory rolling compactor, which is necessary for making samples for the four-point bending beam test. All purchases shall adhere to CSU bidding standards.

All equipment purchased with contract funds shall be the property of CalRecycle and must be returned to CalRecycle at the end of the contract term. However, at the conclusion of the Contract, if Contractor desires to keep any such equipment, CalRecycle may, at its discretion, consider selling any equipment purchased with contract funds to Contractor at fair market value.

Task 3: Final and Quarterly Reports

The Contractor shall submit quarterly reports to the CalRecycle Contract Manager, which shall provide measurable performance data demonstrating the progress made on the project. Information shall be provided regarding the number of publications and related information that are distributed. The quarterly reports shall also include quarterly expenditures for labor, materials, , equipment purchases, and administration.

The Contractor shall provide final reports that summarize any investigation and material testing completed under this contract. The reports must follow the

requirements described in Section VIII, Written Document Provision. The final report shall include: the testing procedures and methods used to obtain the material testing results, analytical data, and a summary of findings and conclusions. Upon request by the CalRecycle Contract Manager, the Contactor will present the findings of work completed under this contract at a regular CalRecycle Public Meeting or appropriate technical workshop or seminar.

IV. CONTRACT/TASK TIME FRAME

The following table shows the schedule for each task.

Task Num	Task Description	Start Date	Finish Date
Task 1	Operate the TDA Technology Center	5/16/14	5/15/16
a	Assist in TDA technology transfer and training activities	6/16/14	4/15/16
b	Project specific Laboratory and Field Studies and Investigations	5/16/14	5/15/16
c	Provide a Knowledge-based Website to Support TDA Applications	6/16/14	5/15/16
d	Dissemination of educational/informational materials	5/16/14	5/15/16
Task 2	Testing Services for Using Waste Tire as Civil Engineering Materials	5/16/14	5/15/16
a	TDA Laboratory and Field Testing Services	6/16/14	5/13/16
b	RAC Laboratory and Field Testing Services	6/16/14	5/13/16
Task 3	Final and Quarterly Reports	7/1/14	5/15/16

* It is anticipated that this contract will be awarded by May 2014 and will expire May 2016.

The following provisions will be included in the Terms and Conditions or Special Terms and Conditions of the Contract.

V. COPYRIGHT PROVISION

The contractor shall establish for CalRecycle good title in all copyrightable and trademarkable materials developed as a result of this Scope of Work. Such title shall include exclusive copyrights and trademarks in the name of the State of California, Department of Resources Recycling & Recovery (CalRecycle).

VI. CALIFORNIA WASTE TIRES

Unless otherwise provided for in this Scope of Work, in the event the contractor and/or subcontractor(s) purchase waste tires or waste-tire derived products for the performance of this Scope of Work, only California waste tires and California waste tire-derived products shall be

used. As a condition of payment under the agreement, the contractor shall be required to provide documentation substantiating the source of the tire materials used during the performance of this Scope of Work to the contract manager.

VII. WASTE REDUCTION AND RECYCLED-CONTENT PRODUCT PROCUREMENT

In the performance of this Agreement, Contractor shall use recycled content, used or reusable products, and practice other waste reduction measures where feasible and appropriate.

Recycled Content Products: All products purchased and charged/billed to CalRecycle to fulfill the requirements of this contract shall be Recycled Content Products (RCPs), or used (reused, remanufactured, refurbished) products. All RCPs purchased or charged/billed to CalRecycle to fulfill the requirements of the contract shall have both the total recycled-content (TRC) and the postconsumer content (PC) clearly identified on the products. Specific requirements for the aforementioned purchases and identification are discussed in the Terms and Conditions of the Contractual Agreement under Recycled-Content Product Purchasing and Certification.

The Contractor should, at a minimum, ensure that the following issues are addressed, as applicable to the services provided:

VIII. WRITTEN DOCUMENT PROVISION

All documents and/or reports drafted for publication by or for CalRecycle in accordance with this contract shall adhere to CalRecycle's *Guidelines For Preparing Reports (available upon request)* and shall be reviewed by CalRecycle's Contract Manager in consultation with one of CalRecycle editors.

In addition, these documents and/or reports shall be printed double-sided on one hundred percent (100%) recycled-content paper. Specific pages containing full-color photographs or other ink-intensive graphics may be printed on photographic paper. The paper should identify the postconsumer recycled content of the paper (i.e., "printed on 100% postconsumer paper"). When applicable, the contractor shall provide the contract manager with an electronic copy of the document and/or report.

To the greatest extent possible, soy ink instead of petroleum-based inks should be used to print all documents.